GCE A LEVEL MARKING SCHEME

AUTUMN 2020

A LEVEL
GEOLOGY – COMPONENT 1
A480U10-1

INTRODUCTION

This marking scheme was used by WJEC for the 2020 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

GCE A LEVEL GEOLOGY

COMPONENT 1 - GEOLOGICAL INVESTIGATIONS

AUTUMN 2020 MARK SCHEME

Specimens

Specimen B = Dolerite
Specimen C = Breccia
Specimen H = Cornish Granite
Specimen J = Quartz
Specimen G = Slate with *Didymograptus*

Instructions for examiners of A Level Geology when applying the mark scheme

1 Positive marking

It should be remembered that candidates are writing under examination conditions and credit should be given for what the candidate writes, rather than adopting the approach of penalising him/her for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Worthwhile answers that meet the requirements of the question, but do not appear on the mark scheme are to be given credit.

2 Tick marking

Low tariff questions should be marked using a points-based system. Each credit worthy response should be ticked in red pen. The number of ticks must equal the mark awarded for the sub-question. The mark scheme should be applied precisely using the marking details box as a guide to the responses that are acceptable. Do not use crosses to indicate answers that are incorrect.

3 Annotated diagrams

Where a candidate has answered a question wholly or partly by use of an annotated diagram, credit must be awarded to the annotations which form credit-worthy responses as outlined in the marking details box. Candidates must be credited only once for valid responses which appear both as annotations to diagrams and within a section of prose in the answer to the same question.

4. Banded mark schemes

Banded mark schemes are divided so that each band has a relevant descriptor. The descriptor for the band provides a description of the performance level for that band. Each band contains marks. Examiners should first read and annotate a learner's answer to pick out the evidence that is being assessed in that question. **Do not use ticks** on the candidate's response. Once the annotation is complete, the mark scheme can be applied. This is done as a two stage process.

Stage 1 – Deciding on the band

When deciding on a band, the answer should be viewed holistically. Beginning at the lowest band, examiners should look at the learner's answer and check whether it matches the descriptor for that band. Examiners should look at the descriptor for that band and see if it matches the qualities shown in the learner's answer. If the descriptor at the lowest band is satisfied, examiners should move up to the next band and repeat this process for each band until the descriptor matches the answer.

If an answer covers different aspects of different bands within the mark scheme, a 'best fit' approach should be adopted to decide on the band and then the learner's response should be used to decide on the mark within the band. For instance if a response is mainly in band 2 but with a limited amount of band 3 content, the answer would be placed in band 2, but the mark awarded would be close to the top of band 2 as a result of the band 3 content.

Examiners should not seek to mark candidates down as a result of small omissions in minor areas of an answer.

Stage 2 – Deciding on the mark

Once the band has been decided, examiners can then assign a mark. During standardising (marking conference), detailed advice from the Principal Examiner on the qualities of each mark band will be given. Examiners will then receive examples of answers in each mark band that have been awarded a mark by the Principal Examiner. Examiners should mark the examples and compare their marks with those of the Principal Examiner.

When marking, examiners can use these examples to decide whether a learner's response is of a superior, inferior or comparable standard to the example. Examiners are reminded of the need to revisit the answer as they apply the mark scheme in order to confirm that the band and the mark allocated is appropriate to the response provided.

Indicative content is also provided for banded mark schemes. Indicative content is not exhaustive, and any other valid points must be credited. In order to reach the highest bands of the mark scheme a learner need not cover all of the points mentioned in the indicative content but must meet the requirements of the highest mark band. Where a response is not creditworthy, that is contains nothing of any significance to the mark scheme, or where no response has been provided, no marks should be awarded.

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
1	(a)	(i)	**Any two x (1) from:** • sharper teeth on B • teeth closer to the front on B • A skull is more pointed/B is more rounded • B skull is bigger • B has a thicker lower jaw • more openings on B	**2**			**2**		
		(ii)	A is a herbivore because of the position of the teeth far back in jaw/ flattened shape of teeth/ position of the eyes high up skull to view predators/ size of the jaw – explained (1) B is a carnivore because of the forward position of the teeth/ pointed shape of teeth/ forward facing position of the eyes/ size of the jaw – explained (1)		**2**		**2**		
	(b)		Cover with a quadrat (or equivalent) (1) Count up the number of squares (1) Or Credit other relevant method (2)			**2**	**2**		**2**
	(c)	(i)	**Any one x (1) from:** • zero error • parallax error • misreading of the ruler		**1**		**1**		**1**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac

		(ii)	If answer to c (i) is zero error then
			• Measure the distance between the end of the ruler and zero, then add this to the measurements (1)
			If answer to c (i) is parallax error then
			• Make sure eyes are level with the number being read off the ruler (1)
			If answer to c (i) is misreading of the ruler then
			• Take multiple readings and then calculate a mean value (1)
					1		**1**		**1**

	(d)	(i)	132 cm^2 x 3.4 cm (1) = 448.8cm^3 then 448.8 cm^3 x 0.15 (1) 67 kg (1)		**3**		**3**	**3**	**3**
		(ii)	**Any two x (1) from:** • surface may have been harder/softer • footprint could have been eroded • footprint could have been compressed during diagenesis • dinosaur may have exerted a greater force due to its activity, e.g. walking quickly • dinosaur may be in water. • errors in measuring the area/depth of the footprint			**2**	**2**		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(e)	(i)	**Any three x (1) from:** • crater • iridium layer • shocked quartz • tsunami deposits • tektites • global soot layer	**3**			**3**		
		(ii)	Dust from the impact block out the sun (1) Prevents photosynthesis (1) Which disrupts food chain (1)	**3**			**3**		
			Question 1 total	**8**	**7**	**4**	**19**	**3**	**7**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
2	(a)		Strong chemical weathering/hydrothermal alteration (1) Breaks down feldspars (1) **Any one x (1) from** • Halite/ rock salt • Gypsum • Anhydrite • Potash • Any other sensible alternative named resource	**3**			**3**		
	(b)	(i)	Fold axial plane trace in correct place (1) Fold axial plane trace offset by at least one fault (1)		**2**		**2**		**2**
		(ii)	Antiformal anticline (1)		**1**		**1**		
	(c)	(i)	1 mark for each correctly plotted point (2)	**2**			**2**	**2**	**2**
		(ii)	Plunging as dip directions are not opposite (1) Not open as interlimb angle is less than 90° as no dip angles <45° (1) But don't know if limbs are facing towards each other or away from each other therefore cannot classify it as either antiform or synform (1)			**3**	**3**		**3**
			Question 2 total	**5**	**3**	**3**	**11**	**2**	**7**

Question			Marking details	AO1	AO2	AO3	Total	Maths	Prac
				Marks Available					
3	(a)	(i)	Scratch with steel pin (1) — Mineral not scratched (1) Look for parallel planes of weakness/parallel lines on surface (1) Colourless (1)		**4**		**4**		**4**
		(ii)	Quartz (1)		**1**		**1**		
	(b)	(i)	Hornblende (1)		**1**		**1**		
		(ii)	J has a framework structure (1) T has a double chain structure (1)		**2**		**2**		
			Question 3 total	**0**	**8**	**0**	**8**	**0**	**4**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
4	(a)		Short Distance (1) **Any one x (1) from:** • angular • poorly sorted • texturally immature **Any one x (1) from:** • high energy (1) • in slump or landslide (1) Coarse grainsize (or credit quoted numbers) (1)		**4**		**4**		**2**
	(b)		Unconformity (1) **Any one x (1) from:** • discordant • difference in dip/strike amount/direction		**2**		**2**		**2**
	(c)		**Any two x (1) from:** • erosional/weathered surface explained • included fragments explained • fossils explained • difference in dip angle/ dip direction/ strike if these haven't been used in 4 (b)		**2**		**2**		**2**
			Question 4 total	**0**	**8**	**0**	**8**	**0**	**6**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
5			**Indicative Content** see table below **7-9 marks** The response is well-structured and justifies a range of observations/techniques to investigate past environmental conditions. Reference is also made to the sequence of events. Most or all of the observations/techniques are well justified showing that the candidate has a clear rationale for most of the observations that have been proposed. *There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant*. **4-6 marks** The response is quite well-structured and includes a range of observations/techniques to investigate past environmental conditions. Reference is also made to the sequence of events Many but not all of the observations are justified appropriately, showing that the candidate has a reasonable rationale for many of the observations/techniques that have been proposed. *There is a line of reasoning which is partially coherent, supported by some evidence and with some structure. Mainly relevant information is included but there may be some irrelevant information or minor errors.*			**9**	**9**		**9**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			1-3 marks The response makes use of a few observations/techniques with only superficial comments. Justification for the observations is limited, revealing that the candidate has a limited rationale for the observations/techniques proposed. *There is a basic line of reasoning which is not coherent, supported by limited evidence and with very little structure. There may be significant errors or the inclusion of much irrelevant information.* **0 marks** No attempt made or no response worthy of credit.						
			Question 5 total	**0**	**0**	**9**	**9**	**0**	**9**

	Observations suggested	Justification given
Observations to be recorded	Grid reference/ GPS	To enable location to be established
	Sorting	To enable the maturity to be determined
	Grain size	To see how the energy levels changed
	Mineralogy/clast composition	To allow the nature of the hinterland to be reconstructed and to deduce the compositional maturity
	Grain shape	To deduce the distance travelled by the sediment and the medium of transport
	Sedimentary structures	To determine palaeocurrent directions and palaeoenvironment
	Bed thickness	To establish the rate of environmental change
	Fossils	To use uniformitarianism to deduce the environmental conditions and energy levels
	Erosional surfaces	To establish if deposition was continuous
Techniques to be used	Plot a graphic log	To show a visual representation of the rocks present and the variation in grainsize
	Use a grainsize card	To allow accurate grain size/shape/sorting data to be collected.
	Sampling along a transect	To prevent bias in the data collected
	Use of a handlens	To allow accurate data to be collected. To deduce size, shape, sorting and composition
	Use of a tape measure	To measure distances above 30cm for graphic logs
	Use of a compass	To measure palaeocurrent directions.
	Field Sketch	To record macro observations
	Photographs	To record macro observations

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
6	(a)		Suitable scale (1) Shape (1) Detail of the thecae (1)		**3**		**3**	**1**	**3**
	(b)		Stipe and theca(e) (1)	**1**			**1**		
	(c)		G is older than M (1) **Any one x (1) from;** • G has 2 stipes and M only has 1 (1) • M has a more complex thecae than G (1)			**2**	**2**		**2**
			Question 6 total	**1**	**3**	**2**	**6**	**1**	**5**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
7	(a)	(i)	Slickensides (1)	**1**			**1**		
		(ii)	**Credit any one of the following pieces of evidence to a max of 2 marks** • fault breccia (1)/broken clasts formed by fault movement (1) • offset (1)/ marker bed at different heights (1) • fault scarp (1)/ sudden change in altitude due to differential weathering or fault movement (1) • mineral vein (1)/ fault has acted as a pathway for hydrothermal fluids (1) • spring line (1)/ fault acts as a pathway for water (1) • different rocks next to each other (1)/ fault has moved rocks formed at different times next to each other (1) • fault gouge (1)/ fine grained rock formed by fault movement (1) • credit reference to mylonite (1) deformation due to realignment of minerals along the fault plane (1)		**2**		**2**		
		(iii)	Normal (1) **Any two x (1) from;** • hanging wall is to the west (1) • youngest rocks are to the west (1) • hanging wall has moved down/ footwall has moved up (1) • dips towards the downthrown side (1) • vertical movement (1)			**3**	**3**		**3**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
	(b)		F1 is vertical (1) F2 is NE/SW (1)		**2**		**2**		**2**
			Question 7 total	**1**	**4**	**3**	**8**	**0**	**5**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
8	(a)		Dolerite (1) Mafic/dark in colour (1) Crystals between 1mm and 3mm/medium-grained (1)		**3**		**3**		**2**
	(b)		Dyke (1) Credit reference to cone sheet Discordant (1) Small/sheet like/ not big enough to be a pluton (1)			**3**	**3**		**3**
	(c)		Granite (1) Light in colour/ reference to silicic mineralogy/relevant named minerals (1) Crystals larger than 5mm (1)		**3**		**3**		**2**
	(d)		B is younger than H (1) B cuts through H (1)			**2**	**2**		**2**
	(e)		**Indicative Content** Specimen B is basaltic, basaltic magma has low viscosity, low silica content, low gas content and high temperature. Hazards associated with basaltic lava are lava flows, ash falls and volcanic gases. Specimen H is granitic, granitic magma has high viscosity, high silica content, high gas content and low temperature Hazards associated with granitic magma are blasts/explosions, ash falls, pyroclastic flows and lahars.	**6**			**6**		

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			5-6 marks There is a clear response which recognises the links between the composition, viscosity and gas content of basaltic and granitic magma. There may be reference to hazards which are described coherently. All judgements are consistent with the information as analysed. *There is a sustained line of reasoning which is coherent, substantiated and logically structured. The information included in the response is relevant.* **3-4 marks** There is a recognition that different types of magma produce different hazards. There may be some reference to the hazards which are described coherently. Most judgements are drawn that are consistent with the information as analysed. *There is a line of reasoning which is partially coherent, supported by some evidence and with some structure. Mainly relevant information is included but there may be some irrelevant information or minor errors.* **1-2 marks** A variety of volcanic hazards are described only with rather superficial comment. There may be a lack of relevance in places and judgements drawn concerning the links between magma properties and hazard are superficial, with simple comments on the nature of the hazards. *There is a basic line of reasoning which is not coherent, supported by limited evidence and with very little structure. There may be significant errors or the inclusion of much irrelevant information.*						

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
			0 marks No attempt made or no response worthy of credit.						
			Question 8 total	**6**	**6**	**5**	**17**	**0**	**9**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
9			• Base of C correctly plotted near X + Y (1)		1		14	14	14
			• Base of C dipping at 5° towards centre of section (1)		1				
			• Boundaries of B correctly plotted at the surface (1)		1				
			• Boundaries of B dipping at towards X at 60° (1)		1				
			• Correct surface plots of A/E boundaries to the W of F1 (1)		1				
			• A/E boundaries dipping at 30° (accept 20° to 40°) (1)			1			
			• F1 dipping at 70° towards X (1)		1				
			• Correct surface plots of A/E boundaries to the E of F1 (1)		1				
			• A correct cross-cutting relationship shown above surface (1)			1			
			• Syncline fold axis drawn labelled (1)			1			
			• Anticline fold axis drawn labelled (1)			1			
			• Hidden anticline drawn near Y (1)			1			
			• Arrows on the fault (1)			1			
			• Correct thickness of D and A (1)		1				
			Question 9 total	**0**	**8**	**6**	**14**	**14**	**14**

Question			Marking details	Marks Available					
				AO1	AO2	AO3	Total	Maths	Prac
10			The following points should appear on the map: F2 striking E/W (1) F2 cross-cutting all other rock units (1) Dyke (H) offset correctly (1) Cone Sheet (B) cutting dyke (H) (1) F/I boundary drawn correctly to N of F2 (1)			**5**	**5**	**5**	**5**
			Question 10 total	**0**	**0**	**5**	**5**	**5**	**5**
			Paper Totals	**21**	**47**	**37**	**105**	**25**	**71**